URBAN HIGH SCHOOLERS AS CITIZEN SCIENTISTS: A COLLABORATIVE PARTNERSHIP WITH UNIVERSITY NATURAL RESOURCE EDUCATORS

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Introduction

- University undergraduate natural resource degree programs in the U.S. are at risk (Nyland, 2008; Sharick & Frisk, 2008)
  - Dwindling enrollment numbers
  - Limited student diversity
- Urban high school student knowledge and interest in natural resource careers is low (Hager et al., 2007)






Introduction

- High school curriculum limitations…
  - Interaction with natural resource professionals
  - Exposure to outdoor, natural resource-related experiences tied to performance standards
  - Travel funds for field excursions
  - Teacher self-efficacy with natural resource topics






The *EscapE Program*

- ***E***nvironmental ***s***tewardship and ***c***areer ***a***wareness ***p***rogram for ***E***ducation
  - Funded by Environmental Protection Agency and National Fish & Wildlife Foundation
  - Created a partnership between urban high school students, their teachers, university professors, and national wildlife refuge personnel






The *EscapE Program*

- **Goal:** To increase urban student knowledge of natural resource careers by providing opportunities to work with natural resource professionals at Mason Neck National Wildlife Refuge (20 mi. outside of Wash. DC)
  - Refuge personnel expressed need for data on…
    - Vegetative composition of refuge forests
    - Past land-use practices at the refuge






The *EscapE Program*

- Authentic (real-world) learning for students
  - A day in the life of a natural resource professional
  - A point of contact for questions and advice
  - A team-oriented project involving data collection, analysis, and interpretation
    - Tree species composition and size
    - Tree rings (dendrochronology)
    - Soils






Student Scientists: Pre-trip

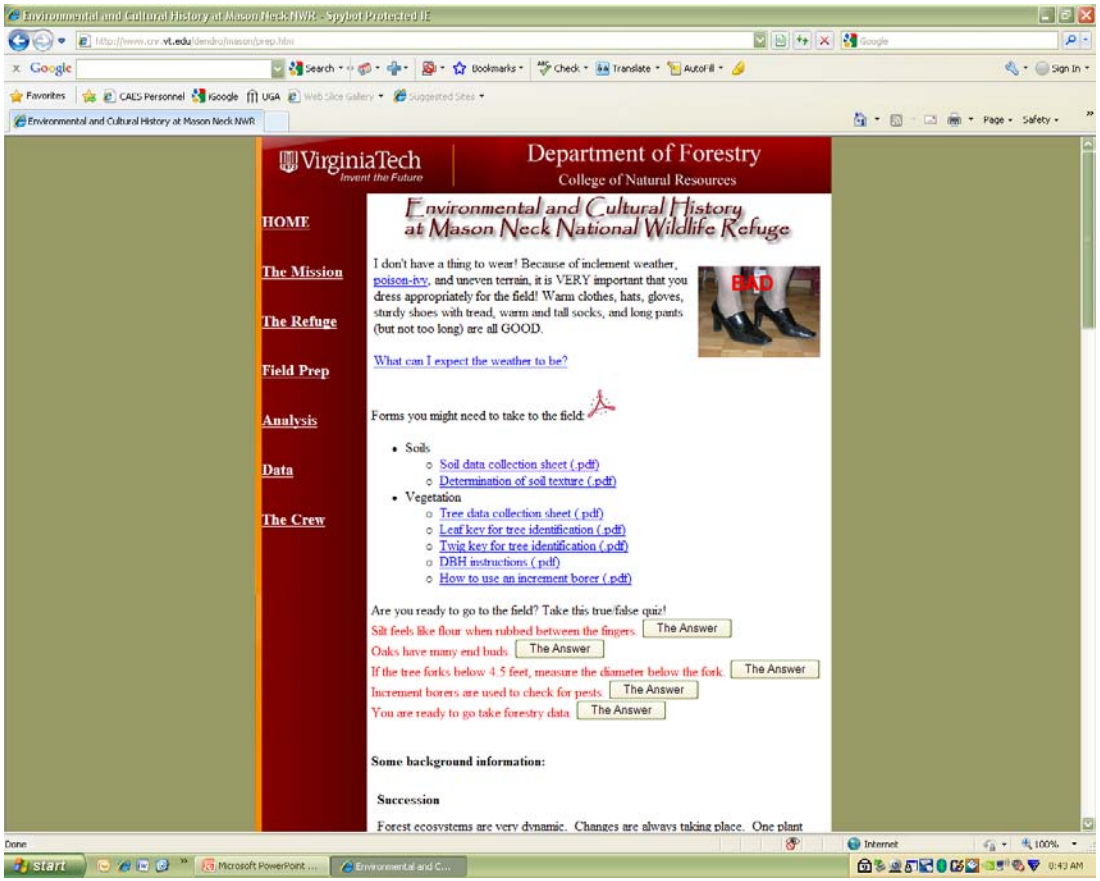
- Teacher training
  - Meet and greet with refuge personnel and faculty
  - Site visit (locate established plots)
  - Equipment use
  - Website

Student Scientists: Pre-trip





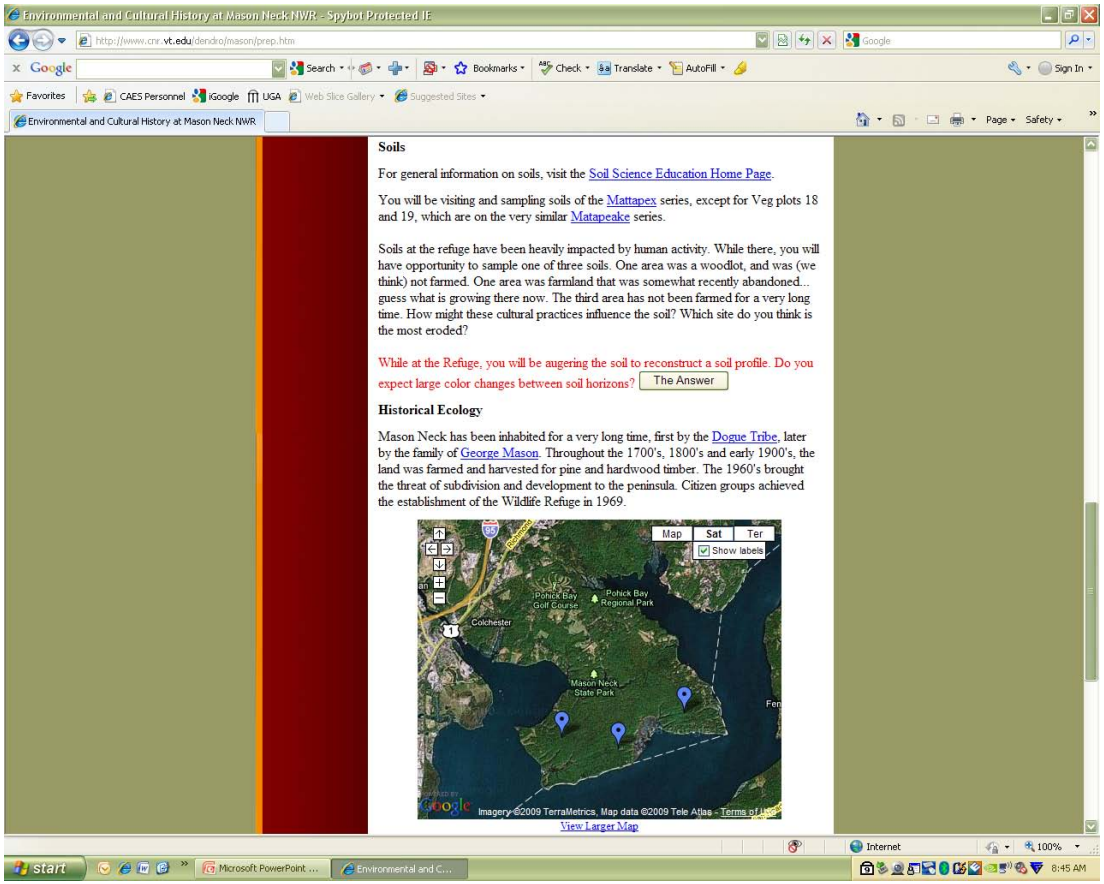

Student Scientists: Pre-trip








Student Scientists: Pre-trip








Student Scientists: At the refuge

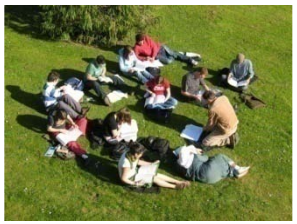
- Measuring the plots for sampling





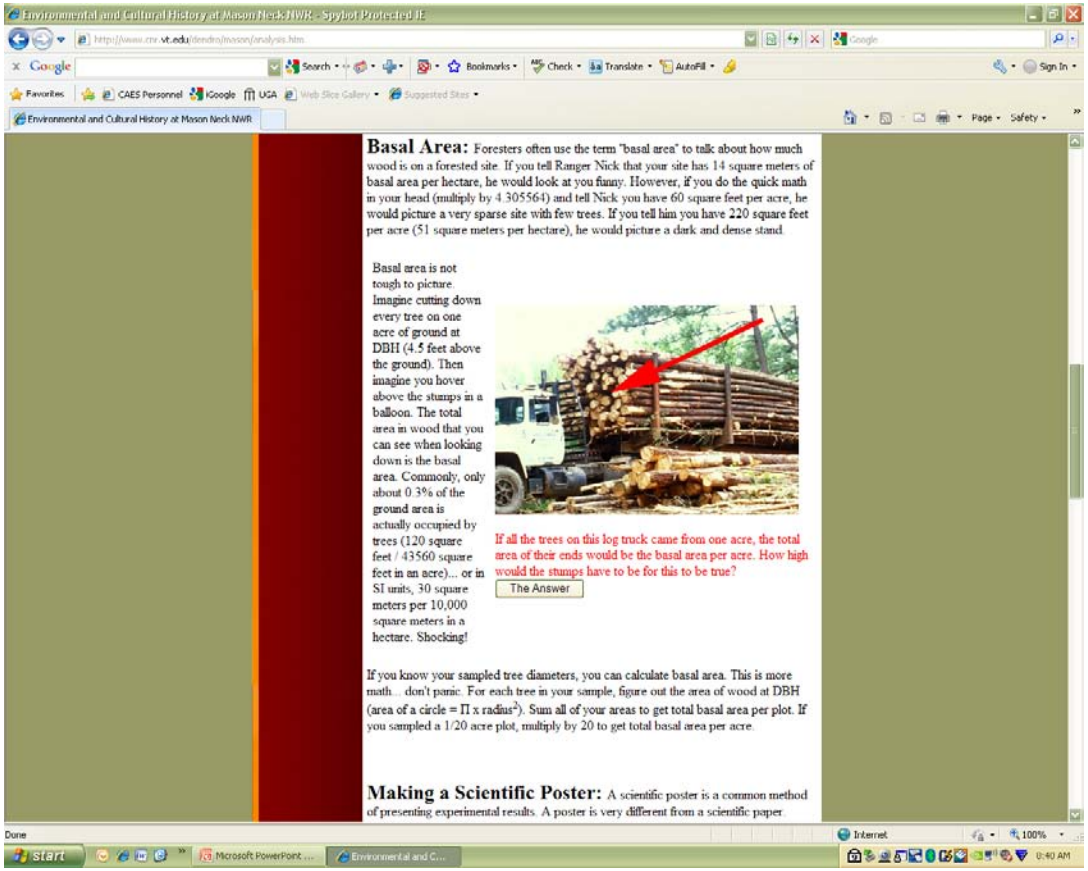

Student Scientists: At the refuge

- Data collection
  - Tree species and size
  - Tree rings
  - Soils






Student Scientists: Post-trip data entry





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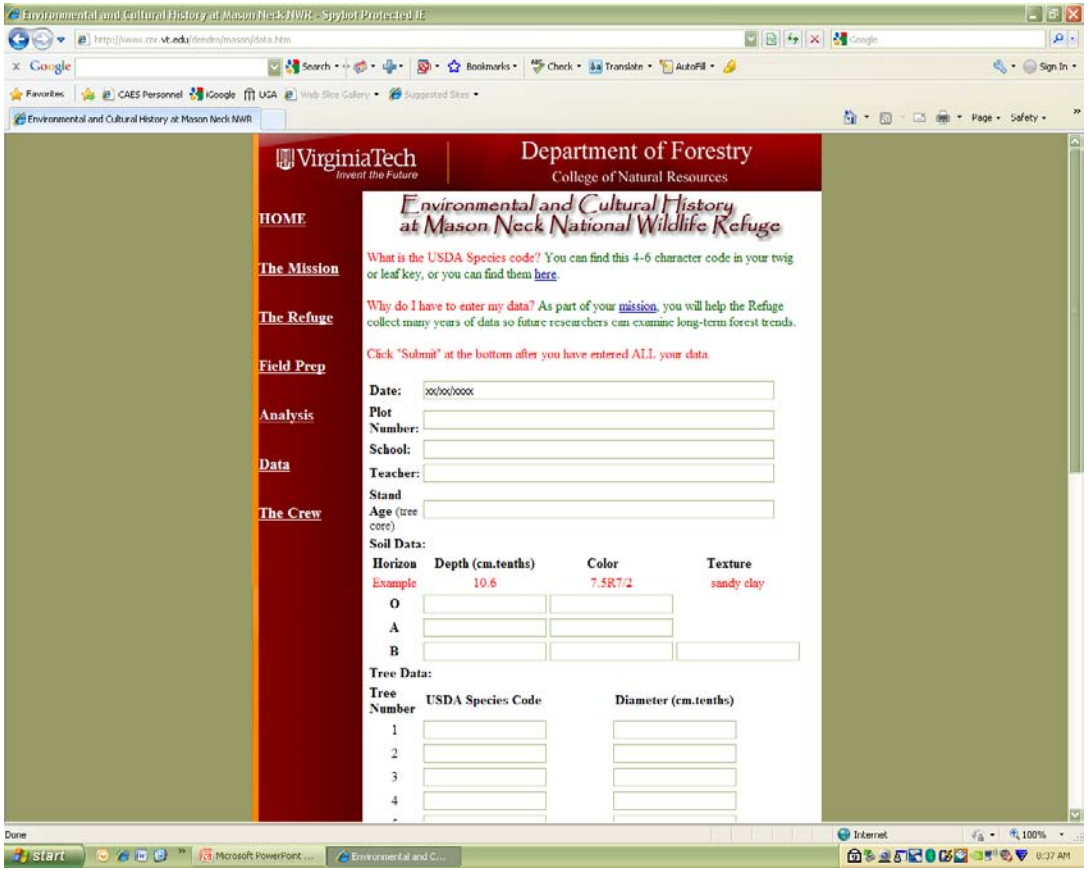






Student Impact: Data Collection

- Online questionnaire (post-then-pre design)
  - Life skill development
  - Science career knowledge
- "Pen pals" with university faculty
  1. Faculty emailed questions
  2. Student teams responded
  3. Faculty offered feedback and follow-up questions






Student Impact: Findings

Construct (5 items/construct)	Internal Consistency (α)	Significant Change?
Problem-solving skills	0.89	No (p = 0.45)
Self-efficacy skills	0.91	Yes (p = 0.04)
Team work skills	0.92	No (p = 0.43)
Communication skills	**0.89**	**Yes (p = 0.007)**

n = 54 students

Science career knowledge (5 items, $\alpha = 0.87$): Moderately to highly influenced






Student Impact: Findings

- Domain (theme) analysis of student pen pal responses

Question	Dominant Domain
What surprised you the most?	"Tree species diversity"
How did things go in your plot?	"Surprised by leadership"
Recommendations for refuge?	"Double check measurements"






Recommendations

- "The teacher training was invaluable!"
- Be on-site and available to teachers
- Develop an answer key within plots (trees tagged)
- Provide pre-trip, on-site, and post-trip instructions
- Fall data collection is ideal (given testing schedule)






The Student Scientists